Salmo Shield® TD

Salmonella Dublin-Typhimurium Bacterin

For use in healthy cattle as an aid in the prevention of disease caused by *Salmonella dublin* and *typhimurium*.

Product Number

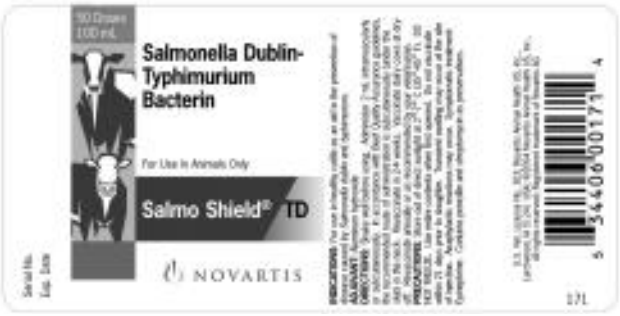
Salmo Shield® TD
171 - 100 mL - 50 doses

- **Safe — Salmo Shield TD** is approved for cattle of all ages including pregnant cows. **Salmo Shield TD** consists of killed, antigenic, whole-cell cultures of bovine field isolates of *Salmonella typhimurium* and *Salmonella dublin.* The product is inactivated using a special process to retain maximum antigenicity.
- **Effective and Reliable — Salmo Shield TD** is adjuvanted with a highly refined aluminum hydroxide for maximum immune response and syringeability.
- **Convenient — Salmo Shield TD** can be administered either subcutaneously or intramuscularly. SubQ administration in the neck is recommended, in accordance with Beef Quality Assurance guidelines. A 2 mL dose provides ease of administration to pregnant cows or young calves.

Salmo Shield® TD

ADJUVANT: Aluminum hydroxide

DIRECTIONS: Shake well before using. Administer 2 mL intramuscularly or subcutaneously. In accordance with Beef Quality Assurance guidelines, the recommended route of administration is subcutaneously (under the skin) in the neck. Revaccinate in 2-4 weeks. Vaccinate dairy cows at dry-off. Revaccinate annually or as recommended by your veterinarian.



PRECAUTIONS: Store out of direct sunlight at 2°-7°C (35°- 45°F). DO NOT FREEZE. Use entire contents when first opened. Do not vaccinate within 21 days prior to slaughter. Transient swelling may occur at the site of injection. Anaphylactic reactions may occur. Symptomatic treatment: Epinephrine. Contains penicillin and streptomycin as preservatives.

Customer Service
(800) 843-3386

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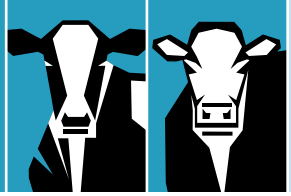

Technical disease information

Salmonella typhimurium
Salmonella typhimurium affects a wide range of hosts, including humans, and is the most common cause of *Salmonella* food poisoning. The bacteria produce a potent endotoxin and are in part responsible for the clinical symptoms.

In cattle, *S. typhimurium* causes an acute to chronic disease characterized by fever, depression, anorexia, weakness and a foul-smelling diarrhea. The stool is watery, brownish in color and often contains pieces of sloughed intestinal mucosa and fresh blood. Later, the organism may localize in joints and cause arthritis, or cause ischemic necrosis of the extremities (ears, tail, etc.) due to disruption of blood flow. In acute cases, death may occur within 1-2 days. Mortality rates average 5 to 10 percent, but may reach 75 percent in severe cases.

The bacteria are picked up either by ingestion or through the navel in newborn calves. They are spread either directly from carrier animals or indirectly through contaminated feed, water and bedding. Studies have shown that *S. typhimurium* can survive on or in soil for 200 or 300 days. Calves may secrete the organism in saliva and it can also be shed in manure, milk and urine from carrier animals.

Calves are more susceptible than adults, but stress factors such as parturition, parasitism, bad weather, poor nutrition and transportation may trigger the disease in older animals.

Salmonella dublin
Salmonella dublin is another of the common causes of salmonellosis in cattle and is found throughout the world. It is fairly well host-adapted to cattle, but can cause severe disease with high mortality rates in humans.

Clinical syndromes seen in cattle include septicemia, acute enteritis and chronic enteritis. Septicemia is more often seen in young calves and occurs when the organism is able to escape from the gastrointestinal (GI) tract into the bloodstream. Signs include depression, fever and death, with or without diarrhea. Nervous system signs may also be seen, as can polyarthritis, pneumonia and dry gangrene of the extremities (ears, tail and feet). Acute enteritis shows symptoms of fever (which may disappear when the diarrhea begins), severe watery diarrhea that often contains blood, pain and straining with defecation. The diarrhea is foul-smelling and contains much mucus and intestinal debris. In less acute cases, there may only be a mild fever, soft feces and lack of appetite. In chronic enteritis, animals will show persistent diarrhea and emaciation. Survivors of the disease will often be unthrifty for their lifetimes, due to permanent damage to the intestinal tract. In pregnant cows, abortion is often seen, either as part of a disease syndrome or as the only observed symptom. *S. dublin* is one of the major causes of abortion in cattle.

Salmonella dublin tends to be endemic on some farms, with morbidity rates above 50 percent and mortality rates approaching 100 percent unless animals are aggressively treated very early. Animals pick up the bacteria orally from feed or water that has been contaminated with infected manure. The bacteria may also be present in animal-origin feedstuffs that have been improperly processed. *Salmonella* can survive for months in wet, warm environments. They can also survive freezing, but are rapidly killed by heat and sunlight. They are also inactivated by most of the commonly used disinfectants. Cleanliness is an important factor in limiting the spread of the infection.

One of the main reasons *Salmonella dublin* is so serious is its tendency to produce long-term carriers. The bacteria localize in the gall bladder, mesenteric lymph nodes, and sometimes the tonsils, from which they are intermittently shed into the manure of clinically normal carrier animals. Carrier cows can also shed the organism into their milk. Calves rarely become carriers, but adult animals can harbor *Salmonella dublin* for years, unlike *S. typhimurium,* with which long-term carriers are uncommon.

Salmonellosis
Salmonellosis usually requires some triggering stress factor such as weaning, movement, or parturition. In addition, animals infested with liver flukes seem to be more susceptible and develop more severe disease. Both calves and adult animals are equally affected, and the severity of the disease depends on such things as the dose size of the bacteria, the immune status of the exposed animals and any previous exposure to the bacteria. In addition, the severity in calves depends on the amount of protective maternal antibody that the calf has gotten from its dam. The disease is more common under intense husbandry where the bacteria spread easily from animal to animal.

Once in the animal's body, bacteria multiply in the gut and produce endotoxins that cause gut damage. If the bacteria remain localized in the gut, the animal develops only enteritis. However, bacteria often penetrate into the lymph nodes, from which they enter the liver and the bloodstream, resulting in septicemia. As mentioned earlier, many animals will become carriers. These carriers usually cannot be cleared up with antibiotics, since the bacteria tend to localize inside tissues where antibiotics cannot easily reach.

This disease is diagnosed by culturing the bacteria, usually at necropsy. The mesenteric lymph nodes will be enlarged and possibly hemorrhagic. The lower jejunum, ileum, cecum and colon are the areas of intestine affected, and will appear necrotic, often with hemorrhagic areas. Diseases that can be confused with salmonellosis include *E. coli* septicemia, Bovine Virus Diarrhea (BVD), coccidiosis and some types of poisoning.

Treatment of affected animals is limited to antibiotics and supportive therapy, which are often ineffective. Prevention of salmonellosis, the preferred route, includes keeping infected animals out of a herd (often hard to do because of clinically normal carriers) and limiting disease spread within a herd. This includes segregating affected animals, disinfecting areas where sick animals have been housed and vaccinating to raise the immune level of the herd.

Salmo Shield TD provides coverage against both *S. typhimurium* and *S. dublin,* the two major causes of salmonellosis in cattle. Animals receive a 2 mL dose of **Salmo Shield TD** followed by a booster dose in two to four weeks.

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